W. Wesley

(13)

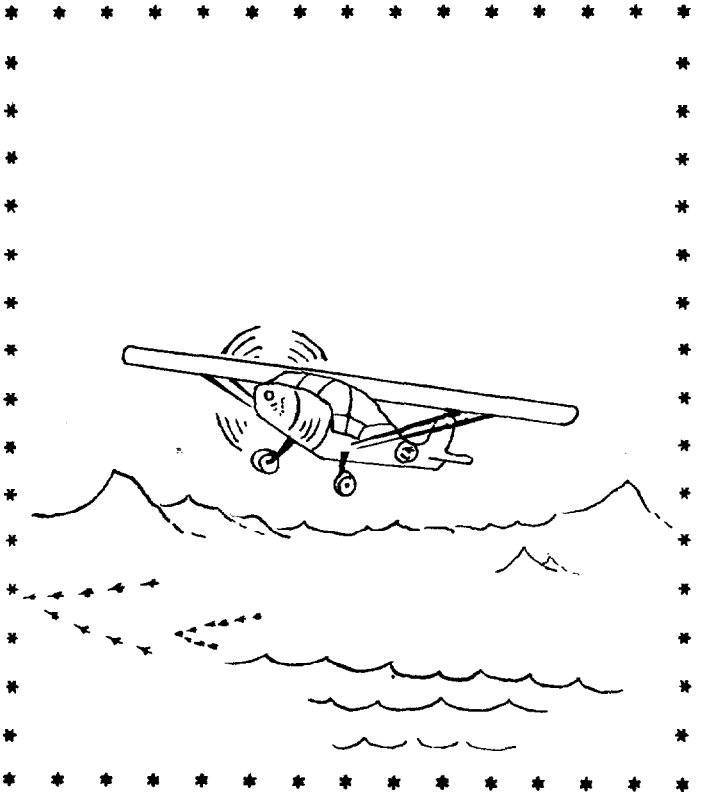
SALTON SEA NATIONAL WILDLIFE REFUGE

AND

WATERFOWL DEVELOPMENT AREAS

NARRATIVE REPORT

SEPTEMBER - DECEMBER, 1951



UNITED STATES DEPARTMENT OF THE INTERIOR

-FISH AND WILDLIFE SERVICE

BRAWLEY, CALIFORNIA

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UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

BRAWLEY, CALIFORNIA

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REFUGE PERSONNEL

Regular Personnel

Edward J. O'Neill	Refuge Manager
Clyde W. Stewart	Foreman-Farm Operations
Jerryl W. Sexton	Clerk-Typist,
Will T. Wesley	Maintenance Man
Jose Barros	Maintenance Man
Earl M. Barker	Mechanic
Alfred W. McFarland	Tractor Operator
Melvin Ford	Traotor Operator
Carl W. Ford	Tractor Operator
Chesley H. Williams	Tractor- Operator
James W. Hamilton	Dragline Operator

Temporary Personnel

John Barros	Irrigator
Sylvester Barros	Irrigator
Roy W. Bennett	Tractor Operator
Raymond L. Gash	Carpenter
William E. Hoff	Laborer
Leon Lesicka	Laborer
Manuel Cardonzo	Irrigator
William L. Lynch	Irrigator
Owen Schutt	Irrigator
Leo E. Cox	Tractor Operator
Paul E. Williams	Tractor Operator

NARRATIVE REPORT

I GENERAL CONDITIONS

A. Weather Conditions

Weather throughout the period was rather pleasant save for a few hot, humid days in September and a number of windy days in December.

Light drizzly rains fell the night of November 22nd, wetting roads and fields badly with the small amount of precipitation received.

On December 13th an unusual, dense fag, blanketed the Valley with heaviest patches occuring near Calexico. Members of the weather station blamed the freak occurance on a moist air mass in the air.

The temperature dropped the lowest since last December, when on the morning of the 15th dame nature emerged sporting a most beautiful sparkling, frosty white coat. In parts of the Valley the mercury dipped as low as 26°. Anti-freeze sales went up as the temperatures rent down, and it was not until well into January that tourists were fully aware that this was truly sunny California.

Tabulated below is the weather data for the period as compiled by the El Centro Naval Air Station at El Centro, Calif.

MONTH	MAXIMUM	MINIMUM	PRECIPITATION	DAYS WINDS OVER 25 MPH
September	111	67	tr	3
October	113	54	tr	3
November	87	41	.21	5
December	78	33	.08	10
		TOTAL	.29	

Early on the morning of December 5th an earthquake of considerable force rocked the Imperial Valley and tore a large 100 foot long crack in the standard and Highline Canal roads and damaged half a dozen homes. The quake shook with a number two intensity and one woman suffered a bruised hip when thrown against

a toppling chest of drawers. Dishes crashed to the floor and furniture shifted back and forth In scores of houses. A District hydrographer reported cracks in the road near the Highline Canal for a distance of 2 or 3 miles. The Mulberry, *or east* portion of the valley, appeared to be the center of the shook, which was said to be worse than the 1940 quake.

B. Precipitation and Water Conditions

The rains of the previous period which resulted in cloud burst proportioned run-off continued to hamper operations well into September. After the clouds cleared, all oi' tracts 5, 6, 12 and 13 in Unit I were reflooded with r-early 1 foot of muddy, yellow water, which refused to drain from the area due to the rise in Salton Sea. Never during the period did the waters recede enough to again expose Tracts 12 and 13, as irrigation water from the balance of Unit I later added to the natural sump area. The dragline operations there were discontinued and may he resumed in the future, if tho waters recede.

The shoreline and elevation of Salton Sea dropped very little throughout the summer months and at the close of the period it was evident that a gradual rise was taking place much earlier than in former, similar years, of low precipitation. Some place the blame *on* the late August rain and others pointed out the tremendous irrigation spillage *from* the Valley's new cotton crop.

From here it appears as though a combination of irrigation waste water drainage, rains and lack of usual (6 ft. per year) evaporation are all to blame. If cotton is important as a waste water crop it could be that next year will see more of both than ever. Cotton yields have been almost fantastic. Poor, secondary lands have brought off one and one-half bale to the acre. Better lands, inland from the Sea are yielding their 3rd and 4th bale! We can expect to see lots of Cadillac pickups and some broad smiles before the last bale is ginned. One 80 acre parcel of land next to tract 18, Unit I, was purchased a few years back for $20.00 per acre. This year the land sold for $100.00 per acre and after the 2nd cotton picking the new owner was sporting a clear title to the land.

C. Fires

Each year the cattails make tremendous growths around fresh water canal and drain estuaries. For years it has been the practice to burn the growth, partly to eliminate black bird roosts near grain crops, but mainly to open areas for operation by the Irrigation District. Gne such fire just west of Unit I, along the SW shores of Salton sea aroused *many a new* citizen with the spectacular black, billowing smoke clouds. One bus driver reported

the Atomic Energy Commission was going up in flames. A local newspaper reporter spent most of the night tramping over the jungle-like area to learn that the rumors were false and some farmer was just burning cattail patches.

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II WILDLIFE

A. Migratory Birds

1. Populations and Behavior

The increased population figures shown on form 3-1750 are accountable somewhat through general expansion of the refuge units. It could be stated that a true picture of population trends is not reflected as is the overall refuge "use" factor.

2. Geese

As early as the torrid days of September, geese were here. On the 1st, three Lesser Snows were present. These we suspected to be hold-over cripples and did not look upon their presence as a natural occurance. They were all capable of extended flights as near as could be determined. Main flights started to arrive early in October. The peak came the week of December 9th, when an estimated 8,600 were present.

On September 29th, 17 White-fronted geese showed up. October 6th, 70 were here and on October 13th an estimated 1,000. After that the arrival was steady and by October 27th 1,300 were here. The species reached an all time peak of 1,800 the week of November 3rd.

Two Canada geese were here October 6th. Our notes at that date read "Weather still in upper 80's, prospective hunters arriving in flower-patterned shirts and straw hats." On October 13th, 15 Canada's were present and 22 on October 21st. The increase continued gradual, by November 18th 900 were here, November 30th, 1,580. On December 22nd an estimate of 2,450 was made. This represents an all time high. About that time one visitor from Montana related how the geese in northern states literally passed over the cold, frozen northern marshes.

Returns on banded Canada geese which were killed near the refuge indicated they were banded by Biologist Horton Jensen at Blackfoot Reservoir, Idaho, and by personnel at the Bear River Refuge, Utah.

Three Lesser Canadas were examined closely during the period. One, a cripple, remained for some time in the headquarters enclosure, disappeared and returned a week or so later. Others were checked in the bags of successful hunters within a stones throw of the Unit I boundary.

December 3rd 8 Ross' Geese showed up at Unit I. Two individuals were observed as close as 100 yards. Throughout the balance of the period from 1 to 3 were seen often with Snow and Canada geese in refuge alfalfa plots. Last year Agent Hooten and State Warden Guy Noel reported a nicked "small white goose" coming through Customs at the International Boundary. Two years ago Agent A. W. Elder received a report that 2 small geese, believed to be Ross' goose, were taken here by a Los Angeles hunter. Three years ago we learned of three young men who bagged two or three small white geese in the desert west of Imperial. (See pp 5, Salton Sea narrative - September - December, 1950) Although literature does not record the Ross' goose as ranging this far south, it would appear the species does and has done so for a number of years.

The Cackling goose, which regularly winters here in small numbers, is not recorded in literature either. This winter only one was seen on the refuge with Canada geese.

Of interest is the two unusual Canada geese which wintered on the refuge. Both birds were partial albinos - one with a white head and neck but normally marked and colored body. The other individual appeared just the opposite - normal head and neck with very light wings and body plumage. Surprisingly, these birds appeared to be mated with normal geese. At all times both were very wary and difficult to approach. An amateur photographer, Mr. Eikhardt, with the aid of telephoto lens, photographed both of the birds. One report indicated the white-necked bird was seen at the State's Honey Lake Refuge in the fall. Another report came in that the same bird was seen last winter in lower Mexico, during the annual waterfowl inventory. Word reached us late in the season that a number of nimrods in the country had either seen or heard of these freaks of nature. A $10.00 reward was being offered for the person killing the white headed bird.

3. Ducks

By September the fall movements of ducks into the Salton Sea country were well started also.

Most prominent the first part of the month was the arrival of some 1,200 Cinnamon Teal and 4,500 Pintails. Fulvous Tree ducks reached a count of 460. The Green-winged Teal also showed a population gain with the arrival of 300. Some 160 American Coots were present at the same time. Total waterfowl

population then was estimated to be 7,150 birds.

The following few days in early September saw Cinnamon double in numbers with 2,100 present. First Shovellers of the season arrived when we recorded 2 individuals. Baldpates also were now on the fall list, with 10 present. Fulvous ducks reached a peak of 530. Most outstanding were the Pintails with a population of 8,200. By this time the waterfowl population on the refuge was estimated to be 11,850 birds.

The last of September found a drop in Cinnamons to 400; Shovellers went up to 230; 900 Ruddy ducks; 180 Baldpates; 2,080 Green-winged Teal and 1,500 American Coots. Some 6 Mallards were present and Fulvous ducks dropped to 200.

In mid-October the records read thus: Cinnamon Teal, 500; Shovellers, 200; Ruddy ducks, 500; Baldpates, 190; Green-winged Teal, 400; Mallards, 300 and Coots were up to 2,000. Pintails were steadiest of all species with 10,030 present. Fulvous ducks showed steady decline after this. At this time a total waterfowl population of about 14,000 was present.

Mid-November brought the greatest peak ever to the present refuge setup, an estimated 134,000 ducks and geese present. Cinnamon Teal reached 2,300; Mallards, 300; Gadwalls, 150; Baldpates, 45,000; Pintails, 80,000 and Green-winged Teal 1,200. Coots dropped to about 800.

State Fish and Game Biologist, Mr. William Anderson, banded some 3,500 birds in September and early October on the refuge units. Dry condition of the State units and hunting activities eliminated trapping operations on other than the refuge units. Throughout the season the Federal area accomodated the bulk of the birds as usual.

During the period the Service's L-5 Stinson plane, No. N-720, made two trips into the area. Pilot-Biologist Ross Hanson and the writer continued previous waterfowl census work and made progress photographs of various sections of the refuge area. A survey flight was likewise made of the Colorado River from Blythe to Yuma, to learn more about local distribution of wintering birds.

Tabulated below is a summary of waterfowl populations observed in Imperial Valley during Aerial Surveys;

November 13th and 14th flights: (Late PM and early AM)

STATE IMPERIAL REFUGE	NUMBERS
Baldpates	3000
Pintails	3000
Coots	500
	6500

STATE WATERFOWL MANAGEMENT AREAS	NUMBERS
(Hazard and Unit B)	
Pintails	350
Canada Geese	20
Snow Geese	80
	450

SALTON SEA REFUGE	
Units I and I-I)	
Canada Geese	800
Lesser Snow Geese	3400
Baldpates	30000
Pintails	40000
Teal	1300
Shovellers	200
Ruddy	500
coot..	500
	76400

SALTON SEA AND ADJACENT VALLEY AREAS	
Canada Geese	40
Baldpates	14400
Pintails	200
Ruddy	9300
Buffle heads	170
Lesser Scaup	2600
Canvasbacks and Redheads	580
	25290
	27,290
ESTIMATED TOTAL	~~108~~ 110, 640

December 22nd flights : (Early AM and late PM)

STATE IMPERIAL REFUGE	NUMBERS
Baldpates	1500
coot.	530
	2000

STATE WATERFOWL MANAGEMENT AREAS	
(Hazard and Unit B)	
Baldpatea	2300
Canada Geese	30
White-fronted Geese	20
Unidentified Ducks	200
	2550

SALTON SEA REFUGE (Units I and II)	NUMBERS
Canada Geese	2000
mite-fronted Geese	500
Snow Geese	5000
Baldpates	2000
Pintails	3000
Teal	2000
Shovellers	1500
Coots	300
	34300

SALTON SEA AND ADJACENT VALLEY AREAS	
Canada Geese	200
Snow Geese	2500
Baldpates and Pintails	40000
Other and unidentified ducks	4300
	47000

ESTIMATED TOTAL 81,300

The matter of disturbance of Snow geese by airplanes ha4 been mentioned in previous reports as an important harrassment factor. The following was extracted from the latest (1950-1951) report of the Severn Wildfowl Trust, Covent Garden, London, England by Curator Peter Scott:

". . . . . the diaturbanoe of tha geese by aircraft was nevertheless very great. For some reason wild geese and particularly White-fronted geese, (Barnacle geese behave in th4 same manner) do not become used to aeroplanes. They take wing at once in great alarm at the approach of any aircraft which is heading toward them at a height of less than 5,000 feet and within a mile. This is particularly notiaable in the early part of the season when the flock is not very large. The geese appear to develop a kind of neurosis and fly out into the mudflats where they fancy themselves more secure. So serious did this disturbance become during November and December that the geese were kept continually off their feeding grounds by day and became largely nocturnal."

4. Disease

What appears to have been botulism persisted at Salton Sea during the entire period. Firrt indication of sickness showed up in Pintails and Ruddy ducks during the second week in September. It is believed that an equal number of shorebirds succumbed to the condition, but our observations disclosed about 300 ducks died.

Green-winged Teal from the State units were examined by Dr. E. R. Quortrup, San Diego County Veterinarian (formerly of this Service). Merton Rosen of the State, later examined a Pintail from Unit I of the refuge. Both men pronounosd the sickness as being botulism. No formal laboratory tests were conducted.

Coincidental to the local sickness, a report reaohed Warden George Warden, of' sick and dead ducks in the Blythe, California area. Mr. William Anderson of ths State investigated and discovered a small "dry" lake, known as Ford Lake, northeast of Rlythe. The lake was first filled by heavy rains of the last period, about August 28th. Later, about October 29th, rains again brought the lake up. Anderson found that due to the inaccessibility of the area and muddy shoreline conditions, whioh prevented driving closer than ½ mile, rescue work was impossible. In October very few sick birds were found, It was estimated that about 100 recently lost birds were there. Some birds appeared to have 'been dead for several weeks, few were beyond recognition. Dead birds included Pintails, Baldpates, Green-winged Teal, Shovellers and Avocets, in order of abundance.

creosote bush (Colvillea) was the main submerged vegetation but Baccharis was also dense. The second storm submerged new vegetation which resulted from the August rains. All told about 500 ducks were lost. The Naval Air Base was contacted and in turn pilots drove off ths remaining ducks with airplanes and smoke bombs, Co prevent further use and cantamination of the waters. Little is known of the numerous plya lakes scattered over the local inaccessible desert areas, but they could contribute considerable *in* the way of ducklosses if Ford Lake is a typical example.

5. Shorebirds, Gulls and Terns

Mid-September saw a good variety of mud-probing shorebirds at Salton Sea. Wilson's Phalaropes, Glossy Ibis, Avoaets, Western Sandpipers, Black-necked Stilts, Forester's Terns, Hudsonian and Long-billed Curlews, Least Sandpipers and Yellowlegs all drew the attention of visiting amateur naturalists and photographers.

The usual Ring-billed Gull population was present and on September 29th we estimated that about 2,000 were present on the refuge units. A few Herring and Glaucous winged gulls were present also.

By the laet part of the period the picture was changed. Avocets, Black-necked Stilts and yellowlegs were reduced to a small handfull. Hudsonian Curlews were abssnt as well as Phalaropes, tarns and the other more tender little denizens of Salton Sea's fringed shorelines, In their places are found Mountain Plover grouped together in hundreds, Sprague's Pipits and Long-billed Dowitchers. American

From 300 to 400 Black-bellied Plover spent the winter here, ranging far and wide over the refuge and neighboring irrigated farm fields.

Forester's and Black terns, a8 well as a rare straggler of a Gull-billed tern, were her8 in September but soon departed except for a few Foresters whioh *either* winter here or infrequently revisit the Valley during the winter season.

6. Marsh and Water Birds

Some 60 Sandhill Cranes were reported in December by Mr. Wesley, of the Refuge. They frequented the Mesquite Lake area east of Imperial. Only 5 were seen *on* ths refuge in late December.

On September 30th, Agents Elder and Wooten called our attention to 5 Roseatte Spoonbills whioh they had just discovered on the mouth of' the Alamo River. Upon investigation we managed to find 2 more which brought the total up to 7. These bird8 *were* seen repeatedly in September but appeared gone after the first part of October. Several year8 ago Hr. Ben Skupen, operator of the Alamo River Duck Preserve Club, reported seeing a number of small Flamingos. We *wonder* now if perhaps the Spoonbills were not the subject of hi8 observations. In June of 1951, a "glimpse" observation of one individual was reported in the Valley. (See Yay-August, 1951 Salton Sea Narrative, pp 3). Of the Spoonbills seen, w8 concluded all were immature birds. Undoubtedly they moved north to Salton Sea from the nesting grounds in Mexico, as do the Wood Ibis, Egrets and Pelicans. The species makes an interesting addition to our list of species. There appears to be little difference in th8 habitat her8 and in the country they inhabit in Mexico.

In early September about 1,600 Wood Ibis *were* here. By Ad-October there was only a few cripples to be found.

White-faced Glossy Ibis were very low in numbers as compared with former years.

7. Food and Cover

As evidenced by the tabulations on page 16 under Cultivated Crops, the overall production of food8 for wild ducks and geese continued to show progress. Bird8 are becoming more and more aware of the refuge foods and th8 seclusion from harassment. *This* fall thousands of Pintails were present and continually using the refuge, almost entirely without the knowledge Of the farmers, which they have always plagued at seeding time in the early fall.

In order to acheive better utilization of Unit I dry grain crops, the impoundment pond in Traet 11 was pushed to the fullest extent of available equipment through the early days of the period. Even before completion of dragline and bulldozer work on the upper perimeter, water was running to fill up the lower half of the pond. The fresh water adjacent to grainfields had an almost immediate effect. Ducks, espocially Pintails, flocked in by the hundreds.

Both duoks and geese utilized the large, unbroken Tract 4 of Unit I, first in preference to the much better stand of barley on the smaller, west half of Tract 19, whioh also was near a new (Tract 29-31) fresh water impoundment area. White-fronted geese continued to utilize the Tract 4 field until November 19th, at which time it appeared as though a giant steam roller had passed over the field. Geese use a remarkable tochnique we had never noted before. In taking the grains where the growth was rather tall, both the Snow and White-Fronted geese were seen walking astride individual clumps and actually "walking them down" until they were within easy reaoh. This may account for the completely flattened appearance some of the dry brrlsy fields had after utilization.

The impoundment area, (Tracts 29-31) in the north end of Unit I produced a good stand of mixed Wild Millet and Sudangrass in the upper contours, The lower contours produced very little of the emergants but the production of Widgeon grass (Ruppea) wag surprising. This entire area, planted to bullrush (Scirpus p.) rhyzomes in the previous period, produced very little of the species. At first growth was good, some plants spread as much as 12 feet in 3 month6 time, but with them came the ever present cattails which choked out most of the growth except where bullrush escaped competition by retreating, in a few places, up ths slopes of contours and dikes,

At Red Hill in Unit II, Wild Millet was likewise planted in the upper contours where it produced well. Later it was dominated by *new oat* tail growth.

Wild Millet, although not highly satisfactory here as a marsh food plant, did prove attractive in early September when taken by Pintails and Fulvous ducks. West of Tract 11, Unit I, a small patch of Wild Millet volunteered mixed with Sea Purslane (Seasuvium s). It appeared green and appetizing to Snow geese which moved in during December and utilized both green seed heads and stems of millet and about 20% of the terminal growth of Sea Purslane.

On several occasions *we* observed small groups of Baldpates in the refuge dry barley fields. It is possible that were

an adequate supply available, the species might prefer it to *the green* alfalfa crops. In December, several sacks of feed barley were dumped along one dike to "chum" Pintails for trapping operations. Later we observed the unpredictable Baldpate gleaning the entire offering. During the hunting season Mr. Walter Collins, farmer near Westmorland, reported killing a Baldpate which was "till of barley grain."

During the period 684 bushels of field run barley, shipped in from Tule Lake Refuge, were scattered along the units for supplementary food, Feeding started October 31st and continued throughout the period. Snow geese reacted favorably, but were mainly interested in the green alfalfa crops on and off the refuge.

Again the Snow and "#hits-fronted geese out down and utilized basal stem and root portions of many acres of cattails (Typha d). It was conservatively estimated that on the refuge units alone at least 200 acres of green, current years *growth* was *cut down.* Both Pintails and Baldpates joined the geese and may have benefited a great deal as rootlets and stem debris became available. Some weights of green samples in a measured quadrat indicated that the 200 tares of growth, of whiah we estimated about 60% utilization of individual plants, amounted to about 1500 lbs. of green feed per acre. Surprising enough, the total for the entire acreage would amount to *an* estimated 300,000 pounds *or* 150 tons of green starchy food!

At times the cattail stems were strewn so thiak on the water surface that small, peep sandpipers oould walk from contour to contour across some of the checks.

Marsh and shorebird foods smeared adequate in irrigated fields, along the ever expanding shores of Salton Sea and on the refuge impoundment units. Where Widgeon grass and Horned pondweed flourished in the fresh water units and where drains and canals meet the Sea, insect life seems always abundant. There is always a great variety of water temperatures, salinity, eta., to supply almost any *condition* desired.

B. Upland Game Birds

Gamble Quail held up rather well in population under the pressure of this season's hunting, which ran from November 17th to 26th with a daily limit of 8. Cripples were moat common than after any previous season we'd witnessed.

Pheasants enjoyed a fair season in ths field as best we could determine from observations. The State Fish and Game again released several thousand hatchery-reared birds which "went like Coney Island Red Hots" as an army of hundreds of nis-guided

nimrods invaded the Valley from November 17th to November 26th, for their 2 birds per day bag. The seasonal limit was 10, each to be tagged; 5 hens were permissable in the bag. We saw but a small number of pheasants bagged, but from the sounds of shotguns out our way it can be said that Mr. Du Pont's cash register was in operation as Roadrunners, Hawks and Owls became fewer and fewer along county roads.

Worst of all was the manner in whioh the State Commission decided, just before opening day, that hunting could be started at sunrise instead of the originally announced 8:00 AM. Our faces were crimson when an apprehended early shooter showed us the morning Los Angeles newspaper with the season change write up!

Following the late August floods of the previous period, most of the Screwbean and Mesquite bean seeds lying under trees were washed away or covered by sand. Many birds, especially quail, shifted to higher ground or the desert edge where other plants thrived as a compensating factor for lost habitat.

c. Other Birds

Robins returned in the fall and spent the winter here again. Several flocks ranging from 50 to about 300 were seen often. Choice item of food appeared to be dates in the small groves, where most of the birds stayed. In Los Angeles, Kenneth Stager, of the County Museum, and Dr. John Doris, Occidental College, invited the public to observe specific instances of robins nesting and congregating. This year appears to be the first time in recorded history at the metropolis, the cheerful rod breast showed up in spring and summertime to nest there. Theories were flying as to sudden appearance of robins. Some said it was the increased humidity; others the green lawn sprinklers and resultant earthworms,

D. Fur Animals, Predators, etc.

No notable change over previous period.

If is interesting to note that the last cotton raised in these parts was almost 15 years ago. White-footed mice however, like the idea and refuge personnel, Jose and Sylvester Barros, found a nest of fine, clean cotton which appears tc have been brought in from a field almost ½ mile away. The fiber was as clean as the product from some recleaning plant.

E. Fish

The usual fall spawning run of Mullet from Salton Sea up the New and Alamo Rivers was not so pronounced as in previous years, Fishermen with snag hooks and legal, 6 foot dip nets accounted for only a small number during October and early November.

Three years ago the State Fish and Game Department transrorted a tank load *of* Anchovies, Sea Bass, Halibut and other ocean species from San Felire, Mexico, to Sal-ton Sea. This winter a commercial fisherman drawing up his Mullet nets took a Sea Bass. This *represents* the firstreportor indication that sny of the original stock still survived.

In Units Iand II fresh water impoundment areas small fish are already established. Cormants and Pelicans spentconsiderabletimein the *upper* contours next to the irrigation canal inlet and our guess is that when they are drained for cultivation, control of cattails and reseeding, some whoppers will show up in the deeper pools.

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III REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Developments

Early in the period the levee which encloses Tract 11 of Unit I was completed through the combined efforts of P-6 *and* D-7 bulldozers and the P&H $\frac{1}{2}$-yard dragline. This was *one* of the most outstanding accomplishments during the period, Water at fhis location completed the needs for hungry waterfowl and crop utilization was almost immediately doubled by Pintails.

Two miles of deep, 6 foot drain ditch and $2\frac{1}{2}$ miles of irrigation ditch were constructed at Unit I with the dragline before it was placed under repairs,

At headquarters a 30 x 30 foot enclosure with a water pond and shelter was constructed for retrieved, crippled ducks and geese. Before the end of the period, 9 geese and several ducks had been placed in the enclosure where visitors could view and photograph them at close range. About 3 of the *stronger geese* and most of the ducks, which were banded, managed to recuperate and fly from the enclosure.

Tract 8 of Unit I was cleared of contours and rank growths of Salt Cedar by grader, releveled by landplane and seeded to barley.

Tracts 4, 5, 7, 8, 24 and 25 of Unit I were deep chiseled, disked, landplaned and planted during the period.

In Unit II developments were continued. Tract 17 was contoured by bulldozer and 18 inch concrete drop box structures and pipe were installed for water circulation.

Tracts 2, 9 and 12 of Unit II were deep tilled, landplaned, etc. and planted.

Construction of an oil house and work benches in the Service building at sub-headquarters were continued.

At headquarters a concrete block fence was erected around the office building and lawn.

The P&H Dragline, transferred in from the Wheeler Refuge was sandblasted in early December, preparatory to painting.

The Autocar truck-trailer electric brakes were repaired and a new floor installed on the trailer. General maintenance work included new seals on the GMC Cargo truck wheels, conversion of same to an oil-grease unit for field use, overhaul of the Ford Jeep motor, etc.

B. Plantings

1. Cultivated Crops

Unit I:

Acres under lease	4600
Acres under fallow	320
Acres in crops	1880
Acres under sump, river, etc. .	1400

The fresh water impoundment area (Tract 28-30), although flooded prior to the period, was seeded with additional, soaked Wild Millet to produce as much food as possible and to determine the feasibility of late plantings. The undertaking netted very little in this instance and seed was either taken by ducks or washed aahors by persistent winds.

Tract 5 of Unit I, seeded to certified Mariout Barley the first week of October produced well., however the utilization by geese, between, during and after each irrigation meant complete loss of the 160 acre tract befor the and of the period. We have never seen such heavy, complete green crop use here-to-*fore.*

Scarcely a standing stock of grain could be found in Tract 4. Lots of people saw the field being used each morning and evening. Farmers were delighted; -- pseudo sportsmen,

drooling over the boundary signs, muttered something about "injustice", or a trip to ths Justice, or something.

Unit II:

Acres under lease	2180
Gores under fallow	PO
Acres under crops	880
Acres under sump, river, etc.	900

The fresh water impoundment area around Red Hill in Tract 17 was given a light reseeding in spots to continue the experiment with Wild Millet to determine the best season for growth and seed production. The late planting resulted in fair growth gains through September and early October. Seed production was poor.

In mid-October the lower ends of lands and hare spots in the Tract 1-2 Sudangrass field were worked and seeded to California Common Barley. The results were good and geese grazed the crop throughout the entire period.

Three acres of buckwheat, seeded in October in Tract 9, at fir& progressed well, but shortly before blooming, late in the period, the experimental orop was killed by frost. Recant trials by the local experiment station indicate this species is unsuccessful *in* our desert climate.

During the September meeting of the Lea Pot Committee group, it was decided that hunting would not be recommended for any of Unit II Lea Act acquired lends. Tracts 15 and 22 which were flooded and being held in anticipation of a bunting program, were promptly drained, contours plowed down and the area was tilled and leveled for future cropping. The dense growth of cattails whioh developed during leaching proved an outstanding food item for all species of geese. At times it woe estimated between 6,000 and 7,000 Canadas and Snows were using the field as two and sometimes three tractors worked the land. The basal portion of each available plant stock, regardless of the dehydrated, very hard condition, was completely utilized.

C. Receipts of Seed and Stock

Early in October a carload of barley for supplementary feeding and duck trap baiting was received from the Tule Lake Refuge in accordance with past procedures.

* * * * * * * * * *

IV ECONOMIC USE OF REFUGE

A. Grazing and Haying

The alfalfa seed crop, anticipated during the previous period, was badly damaged during late August rains and what formerly was a crop in great demand, turned out to bra a real problem. The matured crop was well beyond the stage of even fair hay. Farmers called for cattle and sheep to remove ths worst crops, but many tons were baled and sold to coastal citrus growers for fertilizer and ground mulching purposes. After several unsuccessful attempts we finally obtained a band of 1,460 head of sheep, owned by Mr. Arnold Shields, which entered Tracts 18-19, Unit I, on October 15th. The crop, despite somewhat dried, defoliated condition, held the grazing anumals until October 29th (15 days).

Tracts 3 and 4, Unit II, were in much better condition and Permittee Newton Ruston, neighboring farmer, again harvested both fields as No. 2 hay. During the entire summer-fall season Ruston harvested 138 tons of alfalfa hay.

Mr. Lewis C. Copeland, tractor operator with the California Fish and Game, purchased the rain-damaged orop in Tract 27 of Unit I, which netted him 20 tons. His bid for the hay war the only one received.

* * * * * * * * * *

V PUBLIC RELATIONS

A. Recreational Uses

With the close of the regular waterfowl season it was announced In local papers that the refuge was opened to tour. Interested individuals and group8 met and departed from herdquarters cat 1:30 PM every Sundry. Many citizens were guided over each unit to view the bird8 using refuge alfalfa and barley crops and th8 marsh area. Refuge Mechanic Barker contributed many hours of hi8 time in assisting with refuge visitors. A total of 167 people visited the units during conducted tours.

Some 180 members of the Orange County, San Bernardino County and San, Diego County Bird Clubs and University of California students studied bird8 on the refuge units during the period.

1. Public Use	Visitor Days
a. Hunting Use	None
b. Fishing Use	120
c. Miscellaneous Use	387
Total	507

B. Refuge Visitors

NAME	DATE	IDENTIFICATION	PURPOSE
Wm. Anderson (many visits)	9/2	Crlif. F & G	Duck trapping and banding
B. Loveland	9/26	Lea Aot Committee	Refuge tour
W. R. Batley	9/26	Lea Aot committee	Refuge tour
c. B. Miller	9/26	Lea Act Committee	Refuge tour
R. Miller	9/26	Lea Act Committee	Refuge tour
M. Ferguson	9/26	Lea Act Committee	Refuge tour
O. Witcher	9/26	Lea Act Committee	Refuge tour
R. Jeffereoa	9/26	Lea Aot Committee	Refuge tour
Leo L.Laythe	9/26	Regional Director	Refuge tour
K. F. MacDonald	9/26	Refuge Supervisor	Refuge tour
Fred Roes	9/26	CF&G La Quinta	Refuge tour
D. Tillotoon	9/26	CF&G San Francisco	Refuge tour
Larry Rubke	9/26	CF&G Calipatria	Refuge tour
F. M.Francis	10/13	U. S. Senate	Bird observations
R. Frohling	10/16	USN San Diego	Bird observations
R. Ryder	10/16	USN San Diego	Bird observations
B. McEachern	11/5-26	USF&W Merced	Clerical detail
R. Hanson	11/13	USF&W Sacramento	Aerial surveys,
	12/22	Pilot-Biologist	etc.
C. Leichhardt	12/28	G. M. Supervisor	Waterfowl *inventory*
Guy Noel	12/28	CF&G Warden	Waterfowl inventory

C. Refuge Participation

The Supervisor of county schools requested participation *in* the local education program for schools by way of ehort talks on wildlife conservation. We responded by giving a talk, answering question6 and showing the films "Conservation in Action" and "'Haunts for the Hunted". From October 17th through October 19th, 5 county aohools were visited and 1,540 children of the lower grades fired their surprising lists of questions, listened to the refuge function story and thoroughly enjoyed our wildlife films.

On October 18th some 860 persons comprising personnel and families of the Sandea Corporation, AEC Salton Sea Base, *saw* the films "Halibut Fishing" and "Conservation in Action".

Personnel, including the Refuge Manager *and* Jose Barros, participated in a law enforcement meeting of Services, California and Arizona officers at Yuma, Arizona, on November 4th.

Curing the annual dove hunting season Jose Barros and

Jerry1 Sexton participated in patrol and hunters bag inspection as in the past.

D. Violations

The period marks, perhaps, the most successful season of refuge patrol in the history of the refuge. Personnel effected some 45 apprehensions, 30 of which are listed below.

REP'T NO.	NAME & ADD.	VIOLATION	FINE
163	H. Van Diest Paramount, Cal.	Possession of firearms on Federal refuge	$35.00
164	Earl Croft Paramount, Cal.	Possession of firearms on Federal refuge	35.00
165	Harley Brown Calipatria, Cal.	Hunting after hours on Federal refuge	35.00
166	Rex R. Hope Pomona, Cal.	Discharge of firearm on Federal refuge	25.00
167	R. R. Rousseau Claremont, Cal.	Discharge of firearms on Federal refuge,	25.00
168	P. Nordisini Brawley, Cal.	Possession of firearms on Federal refuge	25.00
169	Bob Higgins Brawley, Cal.	Possession of firearms on Federal refuge	25.00
170	Wm. Dube El Centro, Cal.	Possession of firearms on Federal refuge	25.00
171	F. Martin Imperial, Cal.	Possession of firearms on Federal refuge	25.00
172	J. C. Potter Hermosa Beaoh, Cal.	Shooting after hours on Federal refuge	50.00
173	J. R. Jones Long Beach, Cal.	Taking Glossy Ibis	25.00
180	A. K. Johnson Redondo Beach, Cal.	Hunting after hours on Federal refuge	50.00
181	L. C. Korioh Venice, Cal.	Hunting after hours on Federal refuge	50.00
182	R. A. McClelland Venice, Cal.	Hunting after hours on Federal refuge	50.00
183	R. D. Potter Los Angeles, Cal.	Hunting after hours on Federal refuge	50.00
184	L. Johnston Costa Mesa, Cal.	Possession of firearms on Federal refuge	25.00

REP'T NO.	NAME & ADD.	VIOLATION	FINE
185	O. Deerham Orange, Cal.	Possession of firearm8 on Federal refuge	$25.00
186	Joe Lorente Los Angeles, Cal.	Possession Of firearms on Federal refuge	25.00
187	c. w. Poole Long Beach, Cal.	Possession of firearms on Federal refuge	25.00
188	V. E. Lind San Diego, Cal.	Possession of firearms on Federal refuge	25.00
189	Don Denham San Bernardino, Cal.	Possession Of firearms on Federal refuge	25.00
190	R. H. Arnold Lo8 Angeles, Cal.	Possession of firearms on Federal refuge	25.00
191	J. Facinelli Los Angeles, Cal.	Possession of firearm8 on Federal refuge	25.00
192	M. Handcock La Mesa, Cal.	Possession of firearms on Federal refuge	35.00
193	Leo Austin El Centro, Cal.	Possession of firearms on Federal refuge	25.00
194	H. B. Turner El Centro, Cal.	Possession of firearms on Federal refuge	25.00
195	L. B. Pearson San Diego, Cal.	Possession of firearms on Federal refuge	35.00
196	M. E. co2 El Cajon, Calif.	Possession of firearms on Federal refuge	35.00
197	Ronald Rince Newport Beach, Cal.	Failure to show license on demand	10.00
198	D. J. Steele Pasadena, Cal.	Possession of firearms on Federal refuge	25.00
199	H. J. Forrester Compton, Cal.	Hunting after hours	35.00

* * * * * * * * *

VI OTHER ITEMS

A. Items of Interest

The State shooting grounds adjacent to the Federal units I and II were the subject of an article in the September issue of the Sports Afield magazine. The article, entitled "Poor Man's Million-Dollar Duck Club", was written by Lupi Saldana, Los Angeles Daily News columnist. Subject matter described a hunting trip taken by the author and companions in the State-managed shooting grounds.

"WORD FROM WASHINGTON INDICATES STATS HURTING GROUNDS AROUND SALTON SEA AGAINST FEDERAL LAW" - - that was the headlines

of an article appearing in tha local Imperial Valley Democrat, Brawley, California, December 20, 1951. The artiola went on - "The Fish and Wildlife Service (should have been California Department of Fish and Game) went at the hunting game in a thorough manner *for this* season. Many thouaands of dollars were spent in planting wild rice and barley surrounded by borders and then making a pool alongside the borders with blinds at suitable distances. The effort was successful and when the ducks and geese came to eat the grain they were slaughtered by the hunters.

Private citizens hnw not been allowed to do anything like this under threat of prosecution, but a recent report from Washington states that henceforth the Federal law will be enforced and such practice prevented In the future."

A total of 266 blinds were offered to hunters using the State Fish and Game shooting grounds - all for the sum total of $5.00 *per* man, 2 men per blind. On the Hazard, 60 blinds were ersoted and on the Pumice (Unit B) 206. The Poe area (Unit A) remained undeveloped and was offered for free. Shooting took place on all areas on opening and closing days, and on Saturdays, Sundays, Wednesdays and holidays.

No dogs were permitted PI usual on the $5.00 areas and hunters were encouraged to bring hip boots and flashlights.

The old registration place at Heise's Station on highway 99 was changed to the Hazard area. Minors up to 16 years of age were admitted for $2.50 each.

The old Imperial "Refuge" area near Calipatria remained open to hunting daily as it has been for several years .

An immature white-winged Scoter, shot by Mr. Otto Witcher at the south end of the Salton Sea, during the early part of the hunting season was obtained and turned over to the Los Angeles County museum for a specimen.

Members of A Hollywood motion picture firm, Wild Life Films, currently producing material for a weekly television program entitled "Our Great Out Doors", toured parts of Unit 11 in October to survey the possibilities of a film on refuge program8 and the various forms of wildlife.

A tour of Federal and State Units, followed by a meeting of the Lea Act advisory Committee, took place September 26th. Refuge personnel recorded all meeting minutes and handled

secretarial work for the committee.

Respectfully submitted,

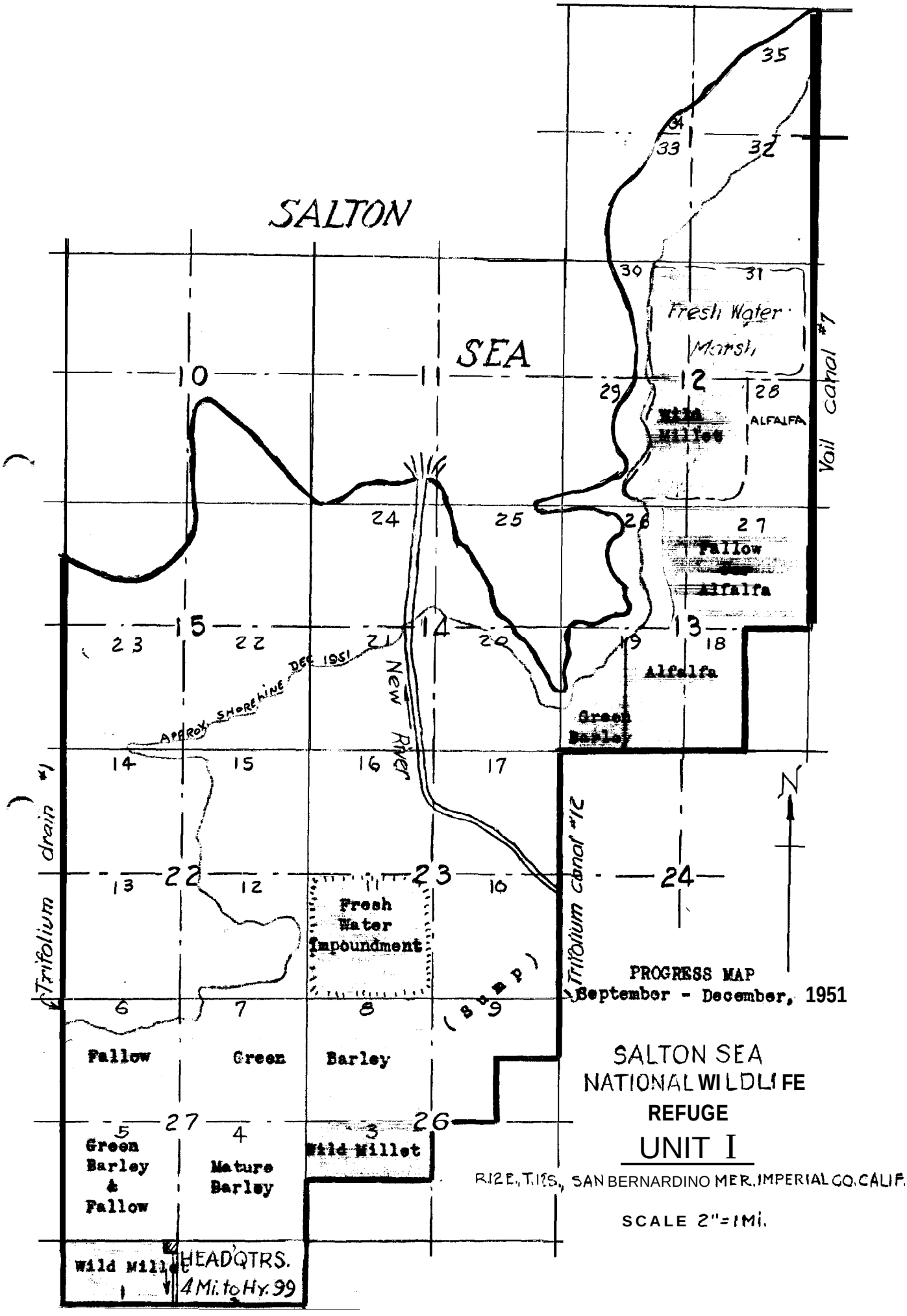
Edward J. O'Neill
Refuge Manager

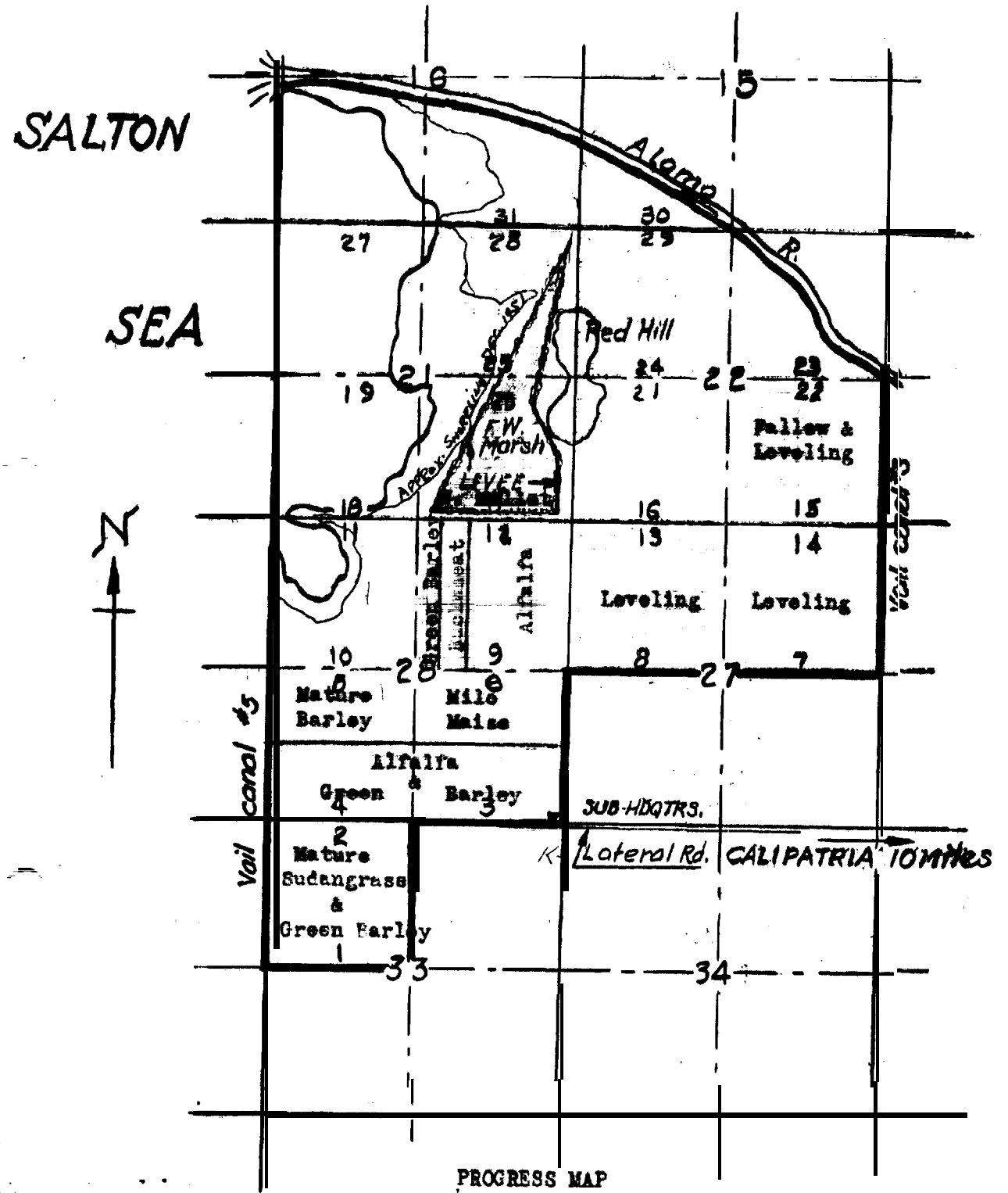
APPROVED:

_____

_____

_____


SALTON
SEA
Fresh Water Marsh
Vail canal #7
Wild Millet
ALFALFA
Fallow
Alfalfa
Alfalfa
Green Barley
APPROX. SHORELINE DEC 1951
New River
Trifolium drain #1
Trifolium canal #12
Fresh Water Impoundment
Fallow
Green
Barley
Green Barley & Fallow
Mature Barley
Wild Millet
Wild Millet
HEADQTRS.
4 Mi. to Hy. 99
N
PROGRESS MAP
September - December, 1951
SALTON SEA
NATIONAL WILDLIFE
REFUGE
UNIT I
R12E., T11S., SAN BERNARDINO MER. IMPERIAL CO. CALIF.
SCALE 2"=1Mi.



PROGRESS MAP
September - December, 1951

SALTON SEA NATIONAL WILDLIFE REFUGE

UNIT II

SCALE 2"=1 MI.

R.13 E., T. 11 S., SAN BERNARDINO MER. IMPERIAL CO. CALIF.

WATERFOWL

Refuge Salton Sea National Wildlife Months of September to December 194~~52~~

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Young Produced		(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Broods Seen	Estimated Total	Estimated for Period
I. Swans:									
Whistling swan									
II. Geese:									
Canada goose	15	10/13	2458	12/22					2500
Cackling goose	1	12/22	1						
Brant									
White-fronted goose	17	9/29	1800	11/3					2000
Snow goose	20	10/13	8600	12/9					10000
Blue goose									
Ross' goose	8	12/9	8	12/9					10
III. Ducks:									
Mallard	2	9/1	1150	11/3					3000
Black duck									
Gadwall			150	11/11					200
Baldpate	previous period		45000	11/11					50000
Pintail	previous period		80000	11/11					100000
Green-winged teal	previous period		2100	11/18					5000
Blue-winged teal									
Cinnamon teal	previous period		2300	11/11					8000
Shoveller	previous period		2600	11/18					4000
Wood duck	1	Dec. ?							
Redhead	5	9/1	50	11/18					200
Ring-necked duck									
Canvas-back									
Scaup	20	11/18	30	11/25					100
Golden-eye	previous period		300	11/18					200
Buffle-head	1	11/18	3	Dec. ?					10
Ruddy duck	previous period		2900	11/3					4000
Fulvous tree duck	previous period		530	9/8					1000
IV. Coot:	previous period		2000	11/3					6000

3-1750
(July 1946)

(over)

Form NR-1

SUMMARIES

Total Production:

Geese _____

Ducks _____

Coots _____

Total waterfowl usage during period _____

Peak waterfowl numbers _____

Areas used by concentrations _____

Principal nesting areas this season _____

Reported by _____

INSTRUCTIONS

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance.

(2) First Seen: The first refuge record for the species during the season concerned in the reporting period, and the number seen. This column does not apply to resident species.

(3) Peak Concentrations: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned in the reporting period.

(5) Young Produced: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted,

(6) Total: Estimated total number of the species using the refuge during the period. This figure may or may not be more than that used for peak concentrations, depending upon the nature of the migrational movement.

Note: Only columns applicable to the reporting period should be used. It is desirable that the Summaries receive careful attention since these data are necessarily based on an analysis of the rest of the form.

2338

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Salton Sea National Wildlife Months of September to December 1951

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Roseatte Spoonbill	5	9/30	7	9/31						
Eared Grebe	previous	period	150	Oct.						
Great Blue Heron	previous	period	20	Dec.						
American Egret	previous	period	180	9/29						
Brewster's Egret	previous	period	300	9/29						
White-faced Glossy Ibis	previous	period	200	9/29	5	11/3				
Wood Ibis	previous	period	1600	9/10	5	10/15				
Green Heron	previous	period	4	Dec.	4	Dec.				
Least Bittern	previous	period	9	Nov.						
Black-crowned Nt. Heron	previous	period	11	9/29						
Clapper Rail	Previous	period	2	Sept						
Sora Rail	previous	period	1	Sept						
Florida Gallinule	previous	period	150	Sept						
White Pelican	previous	period	180	Sept						
Cormorant	previous	period	80	Oct.						
Sandhill Crane	60	Dec.	60							
II. Shorebirds, Gulls and Terns:										
Forester's Tern	previous	period	10	9/29						
Gull-billed Tern	previous	period								
Black Tern	previous	period	230	9/29						
Ring-billed Gull	previous	period	2000	9/29						
Herring Gull	previous	period	10	Nov.						
Glaucous-winged Gull	previous	period	3	Nov.						
Wilson's Snipe	previous	period	1	Sept.						
Black-necked Stilt	previous	period	500	9/29						
American Avocet	previous	period	80	9/29						
Wilson's Phalarope	previous	period	100	9/29						
Western Sandpiper	previous	period	2800	9/29						
Black-bellied Plover	previous	period	400	Dec.						
Least Sandpiper	previous	period	2000	Dec.						
Hudsonian Curlew	50	9/20	50	9/29						
Long-billed Curlew	1500	9/29	1500	9/29						
Long-billed Dowitcher	3000	9/29	3000	9/29						
Yellow Legs	200	9/29	200	9/29						
Mountain Plover	60	12/15	200	12/22						

(over)

(1)	(2)		(3)		(4)	(5)	(6)
II[I]. Doves and Pigeons:							
Mourning dove	previous	period	2000	Oct.			
White-winged dove							
IV. Predaceous Birds:							
Golden eagle	2	11/2	2	11/2			
Duck hawk							
Horned owl	1	9/26	1	9/26			
Magpie	previous	period	4				
Raven							
Crow							

Reported by Salton Sea Refuge

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

3-1752
Form NR-2
(April 1946

UPLAND GAME BIRDS

1613

Refuge Salton Sea National Wildlife Months of _____ to _____, 194__

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
NO CHANGE IN STATUS										

INSTRUCTIONS

Form NR-2 - **UPLAND GAME BIRDS.***

(1) SPECIES: Use correct common name.

(2) DENSITX: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1753
Form NR-3
(June 1945)

BIG GAME

Refuge ~~Salton Sea National Wildlife Refuge~~ Calendar Year _____

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions		(7) Estimated Total Refuge Population		(8) Sex Ratio
Common Name	Cover types, total Acreage of Habitat	Number	Hunting	For Re-stocking	Sold	For Research	Predation	Disease	Winter Loss	Number	Source	At period of Greatest use	As of Dec. 31	
	NO BIG GAME ANIMALS													

Remarks:

Reported by _____

INSTRUCTIONS

Form NR-3 - BIG GAME

(1) SPECIES: Use correct common name: i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.

(2) DENSITY: Detailed data may be omitted for species occurring in limited numbers. Density to be expressed la acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres In each cover type found on the refuge: once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series Bo. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be Indicated under Remarks.

(3) YOUNG PRODUCED: Estimated total number of young produced on refuge.

(4) REMOVALS: Indicate total number in each category removed during the year.

(5) LOSSES: On the basis of known records or reliable estimates Indicate total losses in each category during the year.

(6) INTRODUCTIONS: Indicate the number and refuge or agency from which stock was secured.

(7) TOTAL REFUGE POPULATION: *Give* the estimated population of each species on the refuge at period of its greatest abundance and also as of Dec. 31.

(8) SEX RATIO: Indicate the percentage *of* males and females of each species as determined from field obeervatlone or through removals.

116008

3-1754
Form NR-4
(June 1945)

SMALL MAMMALS

Refuge Salton Sea National Wildlife Refuge Year ending April 30, _____

(1) Species	(2) Density		(3) Removals					(4) Disposition of Furs						(5) Total Population
								Share Trapping						
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control *	For Re-stocking	For Re-search	Permit Number	Trappers Share	Refuge share	Total Refuge Furs Shipped	Furs Donated	Furs Destroyed	
	NO CHANGE IN STATUS													
	NO BIG GAME ANIMALS													

* List removals by Predator Animal Hunter

REMARKS:

Reported by _____

INSTRUCT1 ONS

Form NR-4 - SMALL MAMMALS (Include data on all speclee of Importance in the management program; i.e., muskrats , beaver, coon, mink, coyote. Data on small rodents may be omitted except for estimated total population of each specie8 considered in control operations.)

(1) SPECIES: Use correct common name. Example: St riped skunk, spotted skunk, short-tailed weasel, gray squirrel, fox squirrel, white-tailed jackrabbit, etc. (Accepted common name8 in current use are found in the "Field Book of North American Mammals" by H. E. Anthony and the "Manual of the Vertebrate Animals of the Northeastern United States" by David Starr Jordan.)

(2) DENSITY: Applies particularly to those species considered in removal programs. Detailed data may be omitted *for species* occurring in limited numbers. Density to be expressed in acres per animal by cover types. This informa-tlon is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge: once submitted, this Information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much es to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottom land hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures sub-mitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) REMOVALS: Indicate the total number under each category removed since April 30 of the previous year, including any taken on the refuge by Service Predatory Animal Hunter., Also show any removals not falling under headingslisted.

(4) DISPOSITION OF FUR: On share-trapped furs list the permit number, trapper's share, and refuge share. Indicate the number of pelt 8 shipped to market, including furs taken by Service personnel. Total number of pelts of each species destroyed because of unprime-ness or damaged condition, and furs donated to institutions or other agencies should ,be shown in the column provided.

(5) TOTAL POPULATION: Estimated total population of each species reported on as of April 30 .

REMARKS: Indicate Inventory method(s) used, size of sample area(s), Introductions, and any other pertinent information not specifically requested.

Form NR-5 DISEASE 1616

Refuge Salton Sea National Wildlife Refuge Year 1951-52

Botulism

Period of outbreak September - October

Period of heaviest losses late September

Losses :

	Actual Count	Estimated
(a) Waterfowl		300
(b) Shorebirds		300
(c) Other		

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Areas affected (location and approximate acreage) unknown

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.

Conditions generally good. (Rising sea level, fresh water ponds, etc.)

Condition of vegetation and invertebrate life

Remarks

Lead Poisoning or other Disease

find of disease

Species affected

Number Affected Species	Actual Count	Estimated

Number Recovered

Number lost

Source of infection

Water conditions

Food conditions

Remarks

3-1756
Form NR-6
(April 1946)

FISH

Refuge Salton Sea National Wildlife Refuge Year 194

Species	Relative Abundance	Sport Fishing		Commercial Fishing		Restocking		Number removed for Restocking
		Man days Fishing	Number Taken	No. of Permits	Pounds Taken	Number Stocked	Area Stocked	
			NONE					

3-1757
Form NR-7
(April 1946)

PLANTINGS
(Marsh - Aquatic - Upland)

Refuge Salton Sea National Wildlife Year 194

Species	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount & Nature of Propagules	Date of Planting	Survival	Cause of Loss	Remarks
			NONE					

TOTAL ACREAGE PLANTED:

Marsh and aquatic_____

Hedgerows, cover patches_____

Food strips, food patches_____

Forest plantings_____

3-1758
Form NR-8
(April 1946)

CULTIVATED CROPS

Refuge Salton Sea Nat'l. Wl. Refuge Year 1951

Permittee (If farmed by refuge personnel, so indicate)	Permit No.	Unit or Location	Crops Grown	Avg. Yield per Acre	Permittee's Share		Government's Share or Return				Compensatory Services, or Cash Revenue
							Harvested		Unharvested		
					Acres	Bu. Harvested	Acres	Bu.	Acres	Bu.	
			NO CROPS HARVESTED OR UTILIZED								
		Barley	BARLEY	30 bu						12000	
			SUDAN GRASS	10 bu						1000	
			MILO MAIZE	15 bu						1200	
			Buckwheat	—						CROP FAILURE	
			MILO MILLET	(50 lbs)						(5000 lbs)	

Summary of Crops Grown:

Crop	Acreage	Permittee's Share Acres	Permittee's Share Bushels	Government's Share Harvested Acres	Government's Share Harvested Bu.	Government's Share Unharvested Acres	Government's Share Unharvested Bu.	Total Revenue $

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS

Cultivated Crops Report Form NR-8 should be prepared on a calendar-year basis for all crops harvested or utilized during the calendar year and submitted with the December 31 refuge report.

Permittee – List each permittee separately. If lands of the refuge are farmed by refuge personnel or hired labor, this should be indicated in the Permittee column.

Permit No. – List the number of the Special Use Permit issued to the individual.

Use or Location – The Unit No. or name specified in the Economic Use Plan should be listed in this column.

Crops Grown – A separate line of the form should be used for each crop grown by each permittee or by refuge personnel. This is important, since if each crop grown by each operator is not specifically enumerated, the report will be of no value for statistical purposes,

Average Yield per Acre – It is important that the average yield per acre of each crop grown by each operator should be shown.

Permittee's Share – Only the number of acres harvested or utilized by the permit **tee** for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. It is requested that all crops harvested be reduced to bushels wherever possible, or, as in the case with the harvesting of seed such as that of sweet clover, alfalfa, bromegrass, etc., the total harvested crop in pounds may be shown. Timothy, alfalfa, or other hay harvested by the permittee should be shown on Form NR-10 and should not be shown in the Permittee's Share column.

Government's Share or Return – Harvested – Show the number of bushels harvested for the Government and the acreage from which this share is harvested, both for grain raised by refuge personnel and by permittees. Unharvested – show the exact number of acres of crops allowed to remain unharvested as food and cover for wildlife. An estimate of the number of bushels of grain that is available for the wildlife in such unharvested crops should be shown in the Bushels column.

Compensatory Services or Cash Revenue – Show other services received by the Government in cooperative farming activities, the number of acres of food strips planted for wildlife, the amount of wildlife crops not otherwise reported that are planted by cooperators for the Service, or the cultivation of wildlife plantations. If the permit is on a fee basis, the total cash revenue received by the Service.

3-1570
NR-8a

REFUGE GRAIN REPORT

Refuge Salton Sea National Wildlife Refuge Months of September through December, 1951

(1) Variety*	(2) On Hand Beginning of Period	(3) Received During Period	(4) Total	(5) Grain Disposed of				(6) On Hand End of Period	(7) Proposed or Suitable Use*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Surplus
Barley	72	1600	1672		62	684	746	926	X	X	
Milo Maize	30		30					30	X		
Wild Millet	200		200					200	X		

(8) Indicate shipping or collection points Westmorland, California

(9) Grain is stored at Headquarters, Unit I - Sub-headquarters, Unit II

(10) Remarks

*See instructions on back.

16—61482-1

NR-8a

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)-55 lb., corn (ear)-70 lb., wheat—60 lb., barley-50 lb., rye-55 lb., oats-30 lb., soy beans-60 lb., millet-50 lb., cowpeas—60 lb., and mixed-50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

(1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR-9.

(3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.

(4) A total of columns 2 and 3.

(6) Column 4 less column 5.

(7) This is a proposed breakdown by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.

(8) Nearest railroad station for shipping and receiving.

(9) Where stored on refuge: "Headquarters granary," etc.

(10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

16—61482-1 U S. GOVERNMENT PRINTING OFFICE

3-1759
Form NR-9
(April 1946)

COLLECTIONS AND RECEIPTS OF PLANTING STOCK
(Seeds, rootstocks, trees, shrubs)

Refuge ~~Salton Sea National Wildlife Refuge~~ Year 194~~1~~ 51

Species	Collections				Receipts		Total Amounts on Hand	Amount Surplus
	Amount	Date or Period or Collection	Method	Unit Cost	Amount	Source		
		NONE		NONE				

3-1760
Form NR-10
(April 1946)

HAYING AND GRAZING

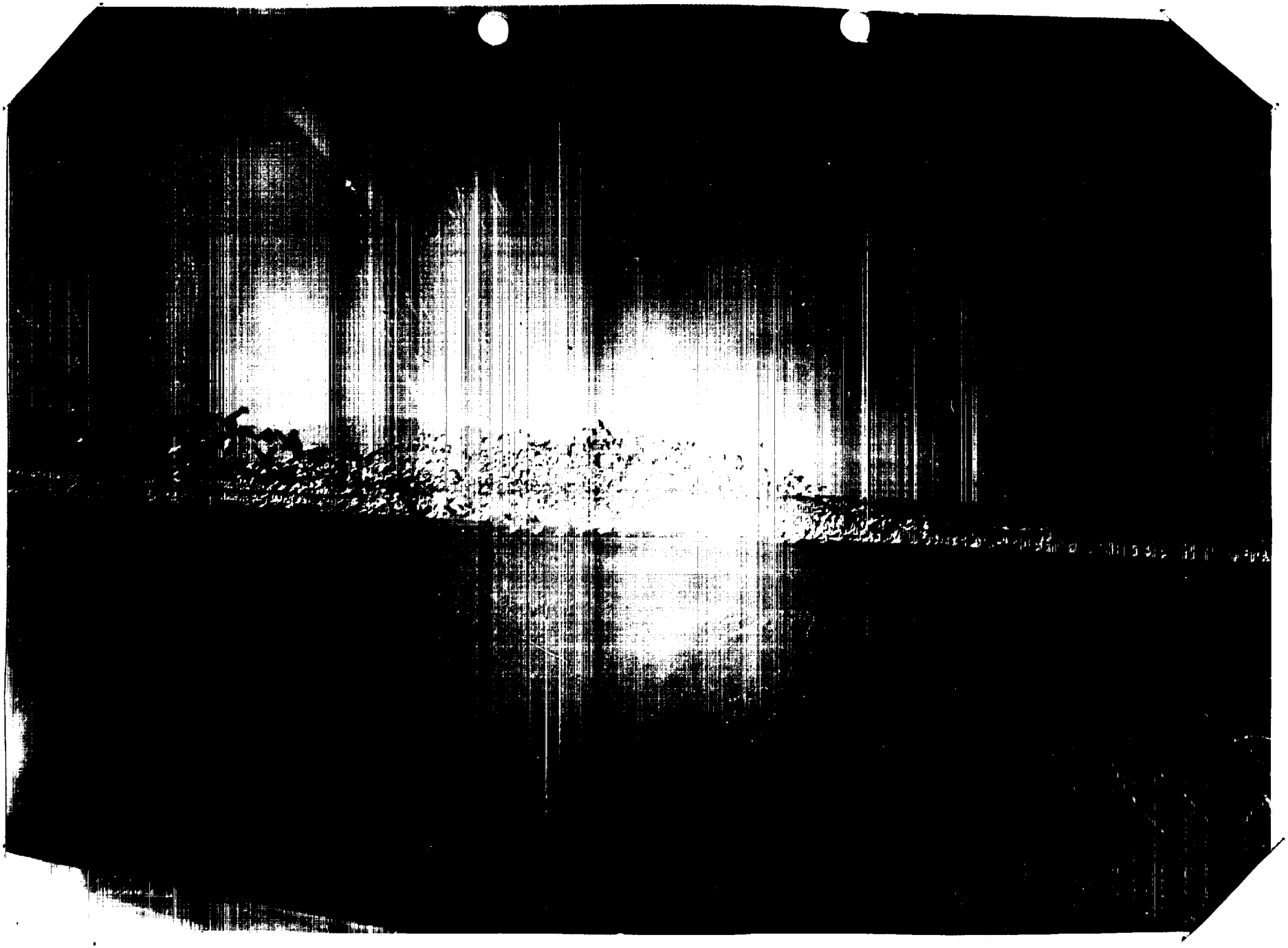
Refuge Salton Sea National Wildlife Refuge Year 194X 51

Permittee	Permit No.	Unit or Location	Actual Acreage Utilized	Animal Use Months	Tons of Hay Harvested	Period of Use From	To	Rate	Total Income	Remarks
Arnold Shields	SAL-10	T3, U2	80			2/8	2/28	2½ ¢		1990 hd. sheep grazing alfalfa
		T18-19, U1	120	1990		2/28	3/9	dph	1492.50	
Arnold Shields	SAL-11	T4, U2	80			3/9		2½ ¢		2000 hd. sheep grazing alfalfa
		T26, U1	80	4000			5/7	dph	1500.00	
Arnold Shields	SAL-12	T18-19, U1	120	56128 aud		4/30	5/23	2½¢ dph	1403.20	1800 hd. sheep graz.
N. J. Ruston	SAL-13	T26, Un 1 T4, Un 2			81 13/14			$14 ton	1147.00	Harvest hay
N. J. Ruston	SAL-14	T18-19 U1			36.4	6/11	6/30	$ 8 ton	291.20	Harvest hay
N. J. Ruston	SAL-15	T3-4 Un 2								Ha rvest hay
N. J. Ruston	SAL-16	T26, Un 1			52.4	6/25	6/30	$10 ton	524.00	Harvest hay
Joe Lesicka	SAL-17	T26, Un 1			22.25	7/30	8/10	$10 ton	222.50	Harvest hay
N. J. Ruston	SAL-18	T18-19 U1			32	8/1	8/10	$ 7 ton	224.00	Harvest hay
N. J. Ruston	SAL-19	T3-4, U2			28	9/1	9/15	$2.50 T	70.00	Harvest hay
L. C. Copeland	SAL-20				7½	10/4	10/15	$ 3 ton	22.50	Harvest hay
L. C. Copeland	SAL-21	T26, U1								Harvest hay
Arnold Shields	SAL-22	T18-19 U1	120	730 aud		10/14	10/29	3¢ dph	657.00	1460 hed. sheep graz.

Totals:

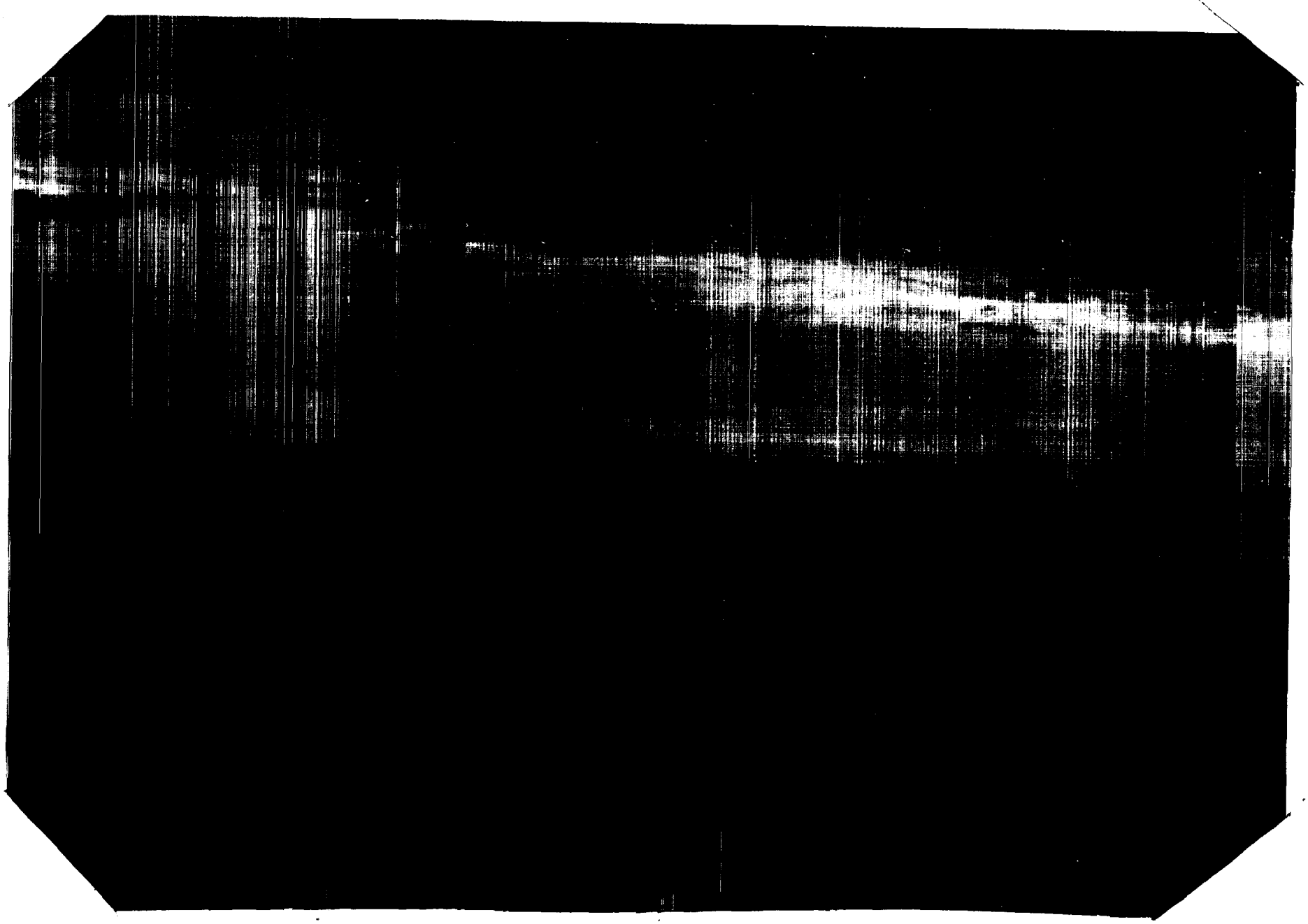
Acreage grazed 600 Animal use months 1895½ Total income Grazing 5052.70

Acreage cut for hay Tons of hay cut 260½ Total income Haying 2501.20

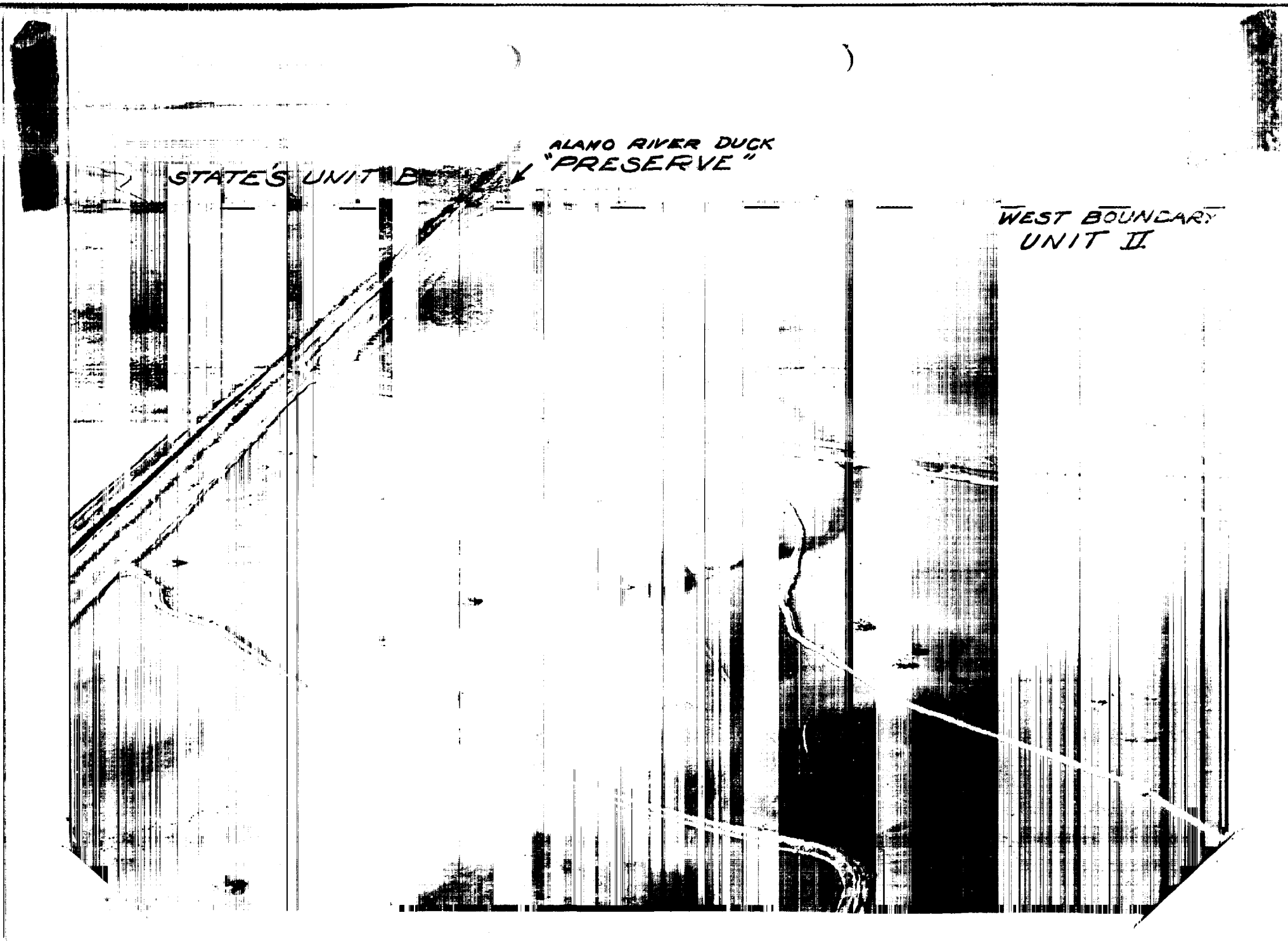


Snow, Canada and White-fronted geese on refuge alfalfa crop, Tracts 18-19, Unit I - December, 1951

Snow geese in refuge alfalfa crop, Tract 27, Unit II - Salton Sea in background - Dec. 1951



Canada geese on refuge mixed barley and alfalfa crop, Tract 3, Unit II - Rock Hill in background
December, 1951



Snow and Canada geese, Tracts 17-18, Unit II - Dec. 1951

BEFORE

Newly completed fresh water impoundment area, Tracts 28,29, and 30, Unit I - March 1951 (west view)

AFTER

Same area as above, September 1951, Wild Millet, Bulrush and Cattail growth. (East view; arrow indicates dead tree in above photo) "Wm. Anderson, State Fish & Game, banded 3500 ducks during Sept."

Wintering birds on refuge - - "the impoundment area in the northend of Unit I produced a good stand of mixed Wild Millet and Sudangrass...."

"A tour of Federal and State units....by Lea Act Advisory Committee took place Sept. 26th...." (State's Sec. 29 along K-Lateral)

...P&H Dragline, transferred from Wheeler Refuge, ...as sandblasted, painted ...nd overhauled..Mechanic ...Barker, left, and Drag-...e operator James W. ...milton, right. Dec., ...51.